Technical Memorandum

TO: FCS Consulting
FROM: Andy Rheaume
DATE: August 9th, 2017
RE: **DRAFT - EVALUATION OF INFILTRATION ON-SITE, REGIONALLY, AND IN THE RIGHT-OF-WAY**

Introduction

During stakeholder engagement meetings, the City has been asked to further evaluate meeting Minimum Requirement 5 in road right-of-way in addition to evaluating on-site and regional infiltration facility costs. The technical memo titled Site Infiltration Capital and Maintenance Consideration provided information for regional infiltration in Downtown. The summary table has been copied into this memo for convenience. The technical memo titled Overlake Regional Stormwater Cost included cost estimates for regional infiltration in Overlake. This memo documents the considerations of district level/right-of-way infiltration considerations.

In summary, on-site stormwater management was found to be the most feasible and cost effective way to infiltrate roof runoff. Regional and district level infiltration options are not preferred due to compounding issues. The following table summarizing the identified considerations and ranking among the three options.

Consideration	Regional Infiltration	District Infiltration	On-site Infiltration
Construction Cost	High	Medium	Low
Siting Feasibility	High	High	Low
O&M cost	Medium	High	Low
Performance	Same	Same	Same
Market Value Impact	Low	Medium	High
Transportation Impacts	Medium	High	Low

Regional Infiltration Facilities

Redmond is building regional infiltration facilities in Overlake to meet Minimum Requirements 6 (runoff treatment) and 7 (flow control). This is feasible due to the depth of the groundwater table making infiltration feasible. Overlake is not within a wellhead protection area so a separated conveyance to infiltrate clean runoff is not necessary.

Regional stormwater infiltration in Downtown is not feasible. The following table was provided in the June 9th 2016 Site Infiltration Capital and Maintenance Considerations Technical Memo. All requirements need to be feasible for regional infiltration to work, only one requirement is feasible.

Feasibility for Regional Infiltration Facilities in Downtown		
Requirement	**Feasibility in Downtown**	**Explanation of Feasibility**
Highly infiltrative soils.	Yes	Soil infiltration rates in Downtown commonly exceed 10 inches per hour.
Stormwater collection system.	No	Infiltration from pollution generating surfaces is not allowed in Downtown's wellhead protection zones. So infiltration of roofs would require a dedicated, parallel stormwater system. Such a system would require construction on every street in Downtown at a very high capital cost and impact on the neighborhood.
Groundwater separation.	No	Groundwater elevation in Downtown may be 5-10 feet from the ground surface. Three feet of separation is required from the bottom of a facility, and the top of the facility would typically have some cover, as well as freeboard above the maximum water surface.
Storage.	No	The lack of groundwater separation means that there would be very little vertical space for storage. Without vertical space, the storage volume would require a very large area of land. Acres of land would need to be set aside from development.

District Infiltration

District infiltration includes constructing infiltration systems in the public right-of-way that would infiltrate runoff from private property. This could be considered in both Overlake and Downtown. Infiltration in right-of-way is infeasible in many cases due to the following reasons.

- *Utility Conflicts*: The primary issue would be current and future utility conflicts. The right-of-way has water, sewer, stormwater conveyance, underground power, fiber optic cable, phone lines, and other utilities that impede the ability to install infiltration facilities. In the early evaluation of regional facilities in Downtown, right-of-way infiltration was considered but ruled out during preliminary engineering due to the

conflicts with other utilities and the desire not to impede future utilities. For example, in the 1980s we did not know we needed room in the right-of-way for fiber optic cables.

- *Right-of-way Dedications*: Each road dedicated to the City dating back to incorporation would need to be evaluated to make sure using the right-of-way for private runoff infiltration is permissible according to the deed. If the infiltration system only manages private property runoff it's likely not a permitted use of the right-of-way based on deed language. The City would be able to have the facility removed at the owner's expense. The City could own and operate the infiltration facility in the right-of-way but the same deed issue would need to be evaluated.

- *Right-of-way Use Permit*: If a private infiltration system is feasible in the right-of-way, the City would follow common right-of-way use practices by issuing a right-of-way use permit to allow the infiltration to be built and exist in the right-of-way. Right-of-way use permits are temporary in nature and can revoked by the City in the event that the right-of-way is needed for another use.

- *Traffic Impacts:* Implementing right-of-way infiltration would include road construction (lesser scale than regional option) and would cause additional traffic impacts with each project. The construction impact on transportation would occur each time a development was under construction. This would be a long term transportation impact that would happen along with development.

On-site Infiltration

The technical memo titled Site Infiltration Capital and Maintenance Considerations, dated June 9th, 2017 provides detailed costs estimates of on-site infiltration for each scenario. The summary table is provided for convenience.

Infiltration Trench Cost Analysis (Typical 1 Acre Development Site)				
Scenario	**Capital Cost**	**Construction Inspection Cost**	**Annual Maintenance Cost**	**Annual Facility Inspection Cost**
0% of roofs infiltrate.	$0	$0	$0	$0
50% of roofs infiltrate 100%	$23,225	$1,500	$250	$125
100% of roofs infiltrate 91%	$10,250	$2,250	$350	$187.50
100% of roofs infiltrate 100%	$46,450	$3,000	$500	$187.50